> technical framework at this time may stifle the introduction of important new technology. We agree, and find that the flexible approach toward PCS standards that we are adopting is the most appropriate approach.[35]

This decision resulted in vigorous innovation and competition among vying PCS transmission schemes.[36]

By contrast, premature government standards in the MVPD marketplace would not only frustrate realization of the benefits achieved in the PC and PCS industries, it could result in an unfortunate replay of the standards-setting fiasco that occurred in the government's selection of a color TV standard in 1950. As Besen and Johnson describe this experience:

> [The color TV experience] suggests that dangers of premature standard setting are especially great if significant refinements are taking place at the same time that the relative merits of the various alternative technologies are being considered. The FCC was probably aware of this danger of premature action, but it was under pressure to make a decision: If selection of an incompatible system was inevitable, the sooner the decision was made the smaller would be the installed base of incompatible black and white receivers. The outcome was, nonetheless, a mistake.[37]

The Commission should be guided by past experience which uniformly recommends against government standards setting in markets, such as the MVPD market, where technology is undergoing rapid change.

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[35] PCS Second Report and Order, 8 F.C.C.R. 7700, at ¶ 137 (1993).

[36] See "CDMA Wins Major Backer in Bells' PCS Primeco," Multichannel News, June 12, 1995, at 1A.

[37] Rand Compatibility Study at 94.

B. If the Commission Adopts an SDTV Standard for Broadcasting, It Should: (1) Ensure that the Standard is Compatible with MPEG-2, "Main Level, Simple Profile;" and (2) Accommodate the SDTV System Components Already Implemented by the Cable Industry and Other MVPDs

The Commission has said that it will consider adopting a standard for "Standard Definition Television" ("SDTV") for digital broadcasting.[38] This effort is an outgrowth of the Commission's HDTV standards-setting process. The HDTV process began in 1987 and only recently was expanded to encompass the possibility of a government standard for SDTV. The particular SDTV standard the Commission is focusing on is the one currently being worked on by the "Digital HDTV Grand Alliance."

For the reasons cited in the previous section, TCI believes it is premature to adopt SDTV standards. TCI is particularly concerned that the Commission not use the HDTV process as a springboard for the adoption of a digital broadcast standard that effectively becomes an SDTV standard for all MVPDs. Allowing the HDTV "tail" to wag the SDTV "dog" could have enormous consequences for all other distribution media, including cable.

If the Commission nonetheless decides to adopt an SDTV standard for broadcasters, TCI urges the Commission to conform this standard to the parameters set forth in the following two sections.

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[38] Notice at ¶¶ 4, 23-24.

1. Any Broadcast SDTV Standard Should Conform to the MPEG-2, "Main Level, Simple Profile" Specification

The Commission should ensure that any digital broadcast SDTV standard it adopts conforms to the MPEG-2, "Main Level, Simple Profile" ("MPEG-2 MLSP") specification for video coding and transport. The MPEG-2 MLSP specification is an international standard, established by the International Telecommunications Union ("ITU") and described by the ITU in ISO/IEC 13818-1 (transport stream) and ISO/IEC 13818-2, Section 8 (video coding).

The MPEG-2 MLSP specification excludes bi-directionally predicted frames, or "B frames," in the picture sequence.[39] TCI strongly urges the Commission to avoid inclusion of B-frame motion coding into a broadcast SDTV standard. B-frame motion coding requires the use of additional memory chips that will add an additional $50 to $60 to the cable operator's costs for each digital cable set-top terminal. The cost of digital boxes even without the additional memory for B frames is substantially higher than the cost for existing analog boxes. Given the Commission's genuine concern that the higher cost of digital boxes will delay the deployment of advanced telecommunications

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[39] There are three types of frames used in MPEG-2 video encoding: I, P, and B frames. I frames are compressed with reference only to the data within that frame, whereas P and B frames use interframe compression. P frames, also known as "predicted frames," are compressed more than I frames and are based on either the previous P or I frame, whichever is closest in the video data stream. B frames are created from both the previous and next I or P frames.

infrastructure,[40] B frames should not be required as part of the broadcast SDTV standard.

Beyond the cost savings, there are three additional reasons to exclude B-frame technology as a required SDTV parameter. First, the resolution enhancements that are cited by some as justification for the additional expense associated with B-frame motion coding are imperceptible to the typical consumer. Only an engineer with a trained eye for spotting digital video artifacts would notice any difference between B-frame-enhanced and non-B-frame-enhanced compression.

Second, technological alternatives are available which are capable of achieving resolution comparable to that produced with B frames without incurring the additional $50 to $60 per digital set-top to implement B-frame technology. For example, for sports and other live video, the digital box could employ DigiCipher® II motion coding enhancements at full resolution without B frames (and at a much lower cost). Alternatively, an MPEG-2 resolution improvement tool, called "dual prime," could be used at the encoder end, also without B frames. Other increasingly clever encoding techniques and the use of higher bit rates where motion challenges are greatest will also produce picture improvements, without the high costs associated with B-frame implementation.

Third, if the Commission were to require B-frame motion coding as part of the digital broadcast SDTV standard, it would,

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[40] See Annual Assessment of the Status of Competition in the Market for the Delivery of Video Programming, FCC 95-186, CS Docket No. 95-61 (released May 24, 1995), at ¶ 67.

in effect, create substantial incompatibility with the millions of digital boxes that will already have been purchased and deployed by cable operators and other MVPDs by the time the broadcast SDTV standard is formally implemented. For example, TCI has already purchased over one million digital boxes implementing MPEG-2 MLSP. Other cable operators and alternative MVPDs have made similarly substantial investments in MPEG-2 MLSP silicon.

2. Any Broadcast SDTV Standard Should Accommodate the SDTV System Components Already Implemented by the Cable Industry and Other MVPDs

TCI strongly recommends that any digital broadcast SDTV standard adopted by the Commission not go beyond the video decoding and transport areas that are at the heart of MPEG-2. The MPEG-2 standard leaves much in the system component area undefined. Examples include treatment of the vertical blanking interval and closed captioning information, as well as the "system information" ("SI") description.[41] Each of these undefined system components represents another area of potential

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[41] The SI description incorporates the necessary information to enable not only broadcast television, audio, and data services, but also the necessary extensions to support the implementation of interactive services. The SI description includes the message that defines network data, as well as program-related information such as program names and program ratings, and clarifications and extensions to the MPEG Program Specific Information ("PSI"). A sampling of the message formats provided include the Service Association Message, the Conditional Access Message, the Service Map Message, the Program Information Message, the Program Name Message, the Virtual Channel Message, the System Time Message, the Network Text Message, and the Network Information Message. In addition, the SI description describes the format of the multilingual character strings used in the system.

incompatibility with non-broadcast technologies if an SDTV standard that is adopted for broadcasters defines system components differently than the SDTV systems that are already in production mode by other MVPDs. The cable industry and CableLabs have spent the last seven years analyzing, testing, defining, and implementing the system components required for an SDTV standard. This activity provides a much more appropriate basis for implementing SDTV than the ATSC process which until recently was focused on the much-narrower issue of HDTV. The system components identified by CableLabs are already embedded in TCI equipment and/or silicon, as well as in the SDTV facilities of other MVPDs. Rather than reinvent the wheel and risk creating incompatibilities with these distributors, the Commission should accommodate these system components in any SDTV standard it adopts for digital broadcasting.

Now is an appropriate time to require the Grand Alliance to make any changes necessary to ensure that its SDTV standard for digital broadcasting conforms to MPEG-2 MLSP, because the Grand Alliance SDTV standard has not been fully formulated. Requiring the Grand Alliance standard to conform to MPEG-2 MLSP and existing system components would not involve abandoning the Commission's previous work. It would simply be another instance of the Commission recognizing the evolutionary nature of standards setting. For example, while the Commission initially received analog HDTV proposals, it subsequently recognized the advantages of digital and requested system proponents to resubmit

all-digital proposals. Similarly, the Commission should now recognize the advantages of accommodating pre-existing SDTV specifications that have already been implemented by the cable industry and others.

TCI looks forward to continuing its work with the Grand Alliance and with the Commission to explain in greater depth the characteristics of our embedded digital plant and the nature of its specific concerns about SDTV standards setting by the Commission. Obviously, more detailed discussions among engineers should follow, and TCI is willing to assist the Commission in any way it can in order to maximize compatibility and minimize consumer disruptions in the implementation of SDTV.

C. If the Commission Adopts a Digital Broadcast SDTV Standard, It Should Not Impose The Standard, Either Directly or Indirectly, on Other Video Distribution Technologies

As noted, TCI believes the Commission should not adopt a digital broadcast standard at this time. However, if the Commission decides to adopt a standard, it should not impose that standard, either directly or indirectly, on other video distribution technologies. This is particularly important if the Commission ignores the recommendations set forth in the previous section and adopts a standard which increases broadcasters' ability to transmit digitally, but limits the ability of MVPDs to maximize their use of digital technology.

Cable and other MVPDs already have begun implementing diverse and innovative approaches to the delivery of digital video. They have done so in an effort to advance the

implementation of digital and the benefits the technology brings to consumers. TCI alone has invested or committed over a billion dollars to facilitate the early transition to digital technology. Millions of digital boxes have been ordered, and business plans are being finalized and implemented. Digital transmissions already are occurring and will continue to be initiated over these non-broadcast technologies before a single television set is capable of receiving over-the-air digital transmissions. In such an evolving landscape, even the suggestion that the Commission will impose a digital broadcast SDTV standard on other MVPDs could delay the significant progress being made in the digital realm, because MVPDs will face the real possibility that the investments they make today will be rendered worthless by the retroactive application of a future government standard. The Commission should not discourage MVPDs from continuing to test various digital approaches. If allowed to flourish, such testing will produce the best approach to digital television and the greatest benefit for consumers, just as the creativity that was allowed to flourish in the PC and PCS industries has resulted in substantial innovation and consumer benefits.

The Commission cannot impose a digital broadcast SDTV standard on MVPDs without seriously threatening the efficiency of each unique transmission medium. Each distribution technology uses different modulation (also called "transmission") schemes in order to optimize the particular characteristics of its medium. For example, DBS uses QSPK modulation, while the cable industry

uses QAM modulation. The Grand Alliance has selected VSB modulation. This diversity of modulation methods is a function of the physics of each transmission medium and could not and should not be standardized across these media.

Not only should the Commission refrain from directly imposing a digital broadcast standard on MVPDs; it should avoid imposing such a standard indirectly, as well. This could happen if the Commission limits direct application of a digital SDTV standard to broadcasting but forces the costs of backward compatibility to be borne by any technology that is inconsistent with the broadcast standard. Such an approach would tend to force other technologies to use the broadcast standard, even though it might be inferior for their subscribers, particularly if the costs of backward compatibility are high. In the end, this could have the same chilling effect on technological innovation as mandating the standard for all technologies. As noted above, the imposition of such backward compatibility costs on non-broadcast distributors is wholly inconsistent with prior Commission precedent in the must carry context, as well as with regard to leased access programming, PEG access programming, and the tier buy-through requirement.[42]

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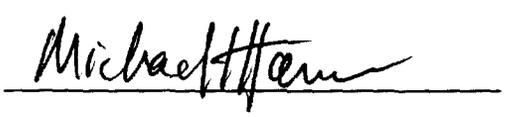
[42] See supra at pp. 15-17.

CONCLUSION

For the foregoing reasons, TCI respectfully urges the Commission to: (1) refrain from enlarging cable operators' must carry obligations beyond a requirement to carry a broadcaster's current primary video service; and (2) refrain from imposing digital standards on the cable industry, either directly, or indirectly through the imposition of backward-compatibility costs.

Respectfully submitted,

TELE-COMMUNICATIONS, INC.



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November 20, 1995